

REMARKS

By the present amendment, claims 1-5 have been canceled and the phrase "on that one end" recited in claim 6 has been modified to "on an end" as suggested in the Action. In addition, the hollow pin in claim 6 has been defined such that this pin is formed in advance into a convex shape in at least part of an inner periphery of the end portion. Entry of these amendments is requested.

In the Office Action, claims 1 and 6 were objected to for two noted informalities. In response, the suggestions contained in the Action with respect to amendments to claim 6 have been adopted as detailed above. Accordingly, withdrawal of the objection is respectfully requested.

Claims 1-10 were rejected under 35 USC § 103(a) as being unpatentable over the patent to Yamamoto et al in view of the patent to Uramoto et al. In making this rejection, it was asserted that the Yamamoto et al patent teaches the subject matter of independent claims 1 and 6 with the exception of the disclosed pin being surface treated. The Uramoto et al patent is then alleged to supply this teaching deficiency as well as the subject matter of the dependent claims directed to the composition of the pin and the surface layer. Reconsideration of this rejection in view of the above claim amendments and the following comments is respectfully requested.

It is submitted that the Yamamoto et al patent does not teach or suggest the pin connection structure as now defined by the present claims. More particularly, the Yamamoto et al patent discloses a pin connection structure for use in a floating type brake disc assembly. However, the Yamamoto et al patent does not disclose, among other things, a hollow pin which is formed into a convex shape in an inner periphery of the end portion.

More specifically, although the hollow pin 8 shown in Fig. 2 of the Yamamoto et al patent has a rounded or arcuate portion 14 on an outer periphery of an external end of a thin-wall tube portion 12 as described in column 4, lines 26-28, the pin does not have a previously chamfered convex shape on an inner periphery thereof. For example, as to the hollow pin 20 shown in Fig. 8(a), it is not described in the Yamamoto et al patent that it has a chamfered portion on the above inner periphery.

According to the Yamamoto et al patent at column 4 lines 32-36, in the outer periphery 16a of a caulked flange 16, the arcuate portion 14 which is an inner side of the caulked flange 16 is in contact with one side surface of a connecting portion 5. In this manner, the contact surface of the connecting portion is prevented from being scored or scratched by the caulked flange 16. On the other hand, according to the pin connection

structure as defined by amended claim 6, the purpose of the hollow point being formed in advance into the convex shape in at least part of the inner periphery of the end portion is to prevent the damage to a surface-treated layer which is formed in advance on a metal surface. The hollow pin therefore is superior in corrosion resistivity and aesthetic appearance. Thus, the reason why the hollow pin is chamfered on the periphery of the end portion in accordance with the present invention is quite different from that of the Yamamoto et al patent.

In addition, although the hollow pin defined as in claim 6 of the present application is made of a metal having a surface-treated layer, the Yamamoto et al patent fails to disclose a pin connection structure having a hollow pin made of such a metal. In order to make up for a deficiency of the Yamamoto et al patent in the surface-treated layer, the Uramoto et al patent is cited in the Action.

The Uramoto et al patent discloses a threaded metal element such as a bolt, a nut and a screw having a surface-treated layer having coated thereon a film of a reaction product between (a) an organic silicon compound and (b) an epoxy compound. A composition comprising two kinds of compounds (a) and (b) according to the Uramoto et al patent at column 5, lines 25-28 is used for the production of threaded metal elements having excellent corrosion resistance. Namely, the above-mentioned film of the reaction product had corrosion resistance or rustproof property. However, the metal element of the Uramoto et al patent exhibits its effects when applied thereon. On the other hand,

according to the present invention, the metal itself having a surface-treated layer has corrosion resistivity.

Regarding the combination of the Yamamoto et al patent (primary reference) with the Uramoto et al patent (secondary reference), it is submitted that the cited patents provide no suggestion to motivate one of ordinary skill in the art to combine their teachings in the manner proposed by the examiner. Specifically, it is submitted that one of ordinary skill in the art would not be led employ the surface treated pin as taught by the Uramoto et al patent in the device disclosed in the patent to Yamamoto et al.

As is well settled, obviousness under Section 103 of the statute requires a teaching or suggestion in the art to combine the teachings of the patents as proposed by the examiner with the expectation that the results achieved would have been predicted by that person of ordinary skill. The patents provide no suggestion to motivate one of ordinary skill in the art to combine their teachings in the manner proposed. Without such a suggestion, any combination is pure speculation on the part of the examiner and is based on a prohibited hindsight reconstruction from applicants' own disclosure.

In addition, it is submitted that even if the combination of the two cited patents were made, the presently claimed invention would still not be achieved. More particularly, since

the hollow pin in the Yamamoto et al patent is in the form of a rectangular shape on the inner periphery of the end portion, even if a material of the hollow pin is substituted with the metal disclosed in the Uramoto et al patent, when the end portion of the hollow pin is caulked, the surface-treated layer of the metal is peeled off from the surface thereof and then a texture of the metal comes out.

Furthermore, an upper end portion of the hollow pin consisting of the brake disc assembly of the Yamamoto et al patent laterally extends in an arcuate form in cross-section. In other words, the thin-wall tube portion is caulked to the extent that the whole upper portion of the original pin element becomes spread toward an outside direction. This demonstrates that the pin element elongates especially at a bending portion. Consequently, when the surface-treated layer based upon the teachings of the Uramoto et al patent is applied to the brake disc assembly of the Yamamoto et al patent, a metal portion of the pin element elongates largely, but the surface-treated layer portion thereof hardly elongates. As a consequence, the surface-treated layer is peeled off and cracking occurs to a film on an end surface, whereby the texture of the metal is exposed to the exterior, resulting in both poor corrosion resistivity and poor aesthetic appearance.

In distinct contrast to the above, the end portion of the hollow pin of the present invention is slightly enlarged radially when caulked. Namely, the end portion thereof is not caulked to the extent that the inner periphery of the end portion of the original pin element becomes spread toward an outside direction.

In summary, since the hollow pin is formed in advance into a convex shape in at least part of the inner periphery of the end portion, and hence, is made of the metal having a surface-treated layer formed in advance according to the present invention, the surface-treated layer is not peeled off from the surface of the metal when the end portion thereof is caulked. To the contrary, because the hollow pin in the Yamamoto et al patent is not chamfered on the inner periphery of the end portion, it is submitted that the effects and advantages of the present invention as aforementioned cannot be expected by combining the teachings of the Yamamoto et al patent with that of the Uramoto et al patent disclosing surface treatment of a metal.

For the reasons stated above, withdrawal of the rejection under 35 U.S.C. § 103 and allowance of claims 6 through 10 as amended over the cited patents are respectfully requested.

In view of the foregoing, it is submitted that the subject application is now in condition for allowance and early notice to that effect is earnestly solicited.

In the event this paper is not timely filed, the undersigned hereby petitions for an

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appropriate extension of time. The fee for this extension may be charged to Deposit Account No. 01-2340, along with any other additional fees which may be required with respect to this paper.

Respectfully submitted,

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PATENT TRADEMARK OFFICE

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Marked Up Version of Amendments to Specification and Claims

IN THE CLAIMS:

Please cancel claims 1-5.

Amend claim 6 as follows:

6. (Amended) A pin connection structure for use in a floating type brake disc assembly comprising:

a hub;

an annular disc which is concentrically disposed around said hub with a clearance therebetween,

said hub and said disc having plural sets of semicircular connecting dents opening toward said clearance to thereby form respective inserting holes;

a hollow pin inserted into each of said inserting holes with a washer fitted on ~~an that one~~ end portion of said hollow pin which is subsequently caulked radially outward for fixing said washer in position,

wherein said hollow pin is made of a metal having a surface-treated layer, and

wherein said hollow pin is formed in advance into a convex shape in at least part of an inner periphery of said end portion.